REMARKS

The Office Action, on page 4, states claims 1-2 are rejected under 35 USC 103(a) as being unpatentable over Roberts et al., US Patent 6,119,084, and the Reynolds article entitled, *Speaker Identification and Verification Using Gaussian Mixture Speaker Models*. The Office Action then goes on to discuss, in connection with the combination of Roberts et al. and Reynolds, claims 1, 2, 11-14, 18 and 20. Therefore, applicant presumes the Office Action meant to state all these claims are unpatentable under 35 USC 103(a) as a result of Roberts et al. and Reynolds. Applicant will proceed on this basis.

Applicant traverses the rejection of claims 1, 2, 11-14, 18 and 20 as being unpatentable over Roberts et al. in view of Reynolds.

In response to the arguments applicant previously submitted, the Examiner relies on column 5, lines 36-44, of Roberts to disclose the features at the end of claim 1 and states this portion of the reference discloses an update of speech template parameters. Thus, the Examiner admits the relied on portion of Roberts does not disclose an update of normalization parameters, but rather an update of speech template parameters which are similar to the parameters of an acceptance voice model (or template), a feature recited at the beginning of claim 1, at line 3. Parameters of an acceptance voice model **are not** normalization parameters to be updated.

Roberts et al., at column 5, lines 36-42, discloses selective modification of template entries when a speaker is verified. The Office Action incorrectly says this passage discloses the features of claim 1 corresponding to updating of normalization parameters. However, the Office Action provides no rationale for this conclusion except for the condition about threshold.

Modification of a template, e.g., an acceptance voice model, is different from updating a normalization parameter, as defined by claim 1, for at least the three following reasons. Roberts explains template modification at column 7, line 54-colum 8,

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line 5, that says the template of a registered user is modified by captured speech samples.

Firstly, Roberts fails to determine normalization parameters, such as $\tilde{\mu}_\lambda$ and $\tilde{\sigma}_\lambda$, and modifies only a template acceptance voice model.

Secondly, although a modification may be functionally similar to an update, the Roberts template modification cannot be a function of a preceding value of a template because the Roberts template does not have a value. In contrast, a normalization parameter has a value and can be updated, contrary to the Roberts template which determines a likelihood with respect to a speaker voice segment to be tested and which can be eventually modified.

Thirdly, the Roberts template modification is not a function of the speaker verification score because the modification depends only on captured speech samples. The speaker verification score is only used if it crosses a threshold.

In addition, the condition to modify the template is not the same as the condition to update a normalization parameter because Roberts indicates this modification occurs if an input utterance is above an acceptance threshold, as stated by the Examiner. This latter point is based on the Roberts disclosure at column 5, lines 49-53, or column 5, line 65-column 6, line 5, as an explanation of that comparison. But Roberts fails to disclose any normalization verification score which is higher than a threshold to provide updating the normalization parameter.

From the foregoing, Roberts fails to disclose any of the features at the end of claim 1.

Contrary to the allegations in the Office Action, the likelihood ratio $\Lambda(X)$ of the Reynolds article is not a normalized verification score as set forth in applicant's claims. The likelihood ratio $\Lambda(X)$ is not a function of speaker verification score S_V and normalization parameters, at least one of which is updated. Furthermore, a likelihood

ratio in the logarithmic form does not have a "normalized" character, similar to the verification score S_V of the application that is already expressed in logarithmic form. The "log" function in itself is not a normalization parameter.

Thus, Reynolds fails to disclose normalizing, by use of normalization parameters ($\tilde{\mu}_\lambda$ and $\tilde{\sigma}_\lambda$), a speaker verification score S_V (similar to the likelihood ratio $\Lambda(X)$) dependent on a likelihood ratio between a voice segment to be tested and an acceptance model and a rejection model for deriving a normalized verification score S_N. Consequently, Reynolds also fails to disclose a comparison of the normalized verification score to a threshold.

Neither Roberts nor Reynolds suggests a normalized verification score as set forth in independent claims 1, 12 and 18. The combination of Roberts and Reynolds relates to a modification of a speech acceptance template (acceptance model) if a raw (not normalized) verification score dependent on the likelihood ratio between a voice segment to be tested and acceptance and rejection models is above a threshold.

In addition, the Office Action confuses the first and second thresholds in claim 1. In order to better distinguish these two thresholds, the ends of claims 1, 12 and 18, have been amended to include the limitation of cancelled claims 11, 13 and 20. Since the limitations of claims 11, 12 and 20 have been previously considered, entry of the amendment is in order.

Roberts discloses only one threshold to which a speaker utterance is compared. This single threshold separates an acoustic feature space into two categories "Accept" and "Reject" (column 5, line 60-column 6, line 2). If the speaker utterance is above this threshold, the speaker is accepted and a template can be modified. If the speaker utterance is below this threshold, the speaker is rejected. Reynolds also discloses only one threshold to accept or to reject a speaker. Applicant's claims indicate the first threshold is used to authorize access to an application by the speaker and a second threshold is used to update a normalization parameter.

Therefore, it would not have been obvious to one having ordinary skill in the art

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at the time of the invention to use the combination of the teachings of Roberts and Reynolds to deduce the features at the end of independent claims 1, 12 and 18 relating to normalization parameters and normalized verification score.

As a conclusion, the combinations of claims 1, 12 and 18 are patentable over Roberts in view of Reynolds. Similarly, claims 2-10, 14-17 and 19 are patentable over Roberts and Reynolds or Roberts, Reynolds and the Viikki et al. article relied on in connection with the rejection of claims 3-10. The Viikki article fails to cure the defects in the rejection based on Roberts and Reynolds.

In view of the foregoing remarks, allowance is in order.

To the extent necessary, a petition for an extension of time under 37 C.F.R. 1.136 is hereby made. Please charge any shortage in fees due in connection with the filing of this paper, including extension of time fees, to Deposit Account 07-1337 and please credit any excess fees to such deposit account.

Respectfully submitted,

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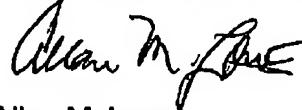
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